ASSESSMENT: WHEN IS ENOUGH, ENOUGH?

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Abstract — This session is really a faculty development session; it is designed to allow FIE participants to have an open and free discussion on the impact of assessment at their institution. There are numerous faculty struggling with both the requirements and the concept of assessment. Their institutions are teaching them how to collect data, but not explaining why we are doing this, the value of the process, or making sure the process fits the constraints of their university. It appears that the process of collecting data is maturing, but as we develop the measurement tools, what is being neglected? Are we forgetting to explain to the rest of the faculty within the department why this is being done? Are we asking for their input? Are we making sure the assessment tool fits the university and does the university have the personnel to complete the process? Thus, at many schools, faculty are starting to fight against assessment because they see it as another duty the administration is forcing upon them without reward for their efforts. The goal of this session is to allow everyone to express their feelings and hopefully, through the discussion, a balance between Work Expended Doing Assessment and the Benefits of Assessment will be created.

Index Terms — Assessment, ABET.

INTRODUCTION

The FIE conference has had a long-standing tradition of holding an open forum during a session titled “Topics on Engineering Education.” Anyone can enter the room and join in on various engineering education topics. During the conference last year, numerous interesting topics were discussed, but none as lively as the discussion on assessment. There were approximately 15 people involved in the discussion, which had two extremes: one faction discussed the value of assessment to improve the curriculum and its positive effect on the classroom, while another faction discussed the flaw in the basic concept of assessment at many universities. Attendees expressed concerns over the nonstop additional work assessment was creating, the assumption that methods developed at one university will work at another, disagreement with the premise that education was a process which accepted students as raw material and produced educated individuals at the terminal end, and the problem that the performance of students with poor preparation, poor habits, lack of motivation, and/or poor ability is difficult to measure. Then somewhere in the middle (we had 3 ABET evaluators in the room), there was a group that tried to bridge the gap between the two extremes. By the end of the session, everyone in the room agreed the session was very helpful, because it brought understanding of the other side of the issue for everyone in the room. Participants in the discussion also agreed it would be beneficial to do this again at FIE2003, but this time with 50+ people in the room.

This session will begin with a number of people from last year acting out a similar discussion for about 15 minutes. At the end of this “little play”, we will open the discussion to everyone in the room, with the hope that it becomes a cross between a talk show and a faculty meeting.

The outcome of this session will hopefully be an open discussion where the education community can assess the assessment process. The fear is that there has been so much discussion over the past few years on assessment that no one is listening anymore. Just because a number of people in the country have developed various assessment tools, the profession thinks the topic is done. Some faculty are saying, “Now that we know how to do this, let’s design the tools and collect the data”. They have moved on to the design and implementation phase, while there are still a significant number of the faculty in this country who are still in the concept phase stage. This stage reflects upon concerns and disagreement with some of the implementation premises. The purpose of this session is to bring these two groups together.

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ADVANTAGES OF ASSESSMENT AND WHY IT IS DONE

Assessment has many advantages. One of the reasons for assessment is to meet the ABET requirements of accreditation. As stated by ABET, the value of Accreditation is it serves to notify parents and prospective students that a program has met minimum standards. Another viewpoint is it gives faculty, deans and administrators information on a program’s strengths and weaknesses and of ways to improve the program. For future employers, assessment assures that graduates are prepared to begin professional practice, and for taxpayers that public funds are spent well. In addition, accreditation can comfort the public that graduates are aware of public health and safety considerations that will affect their everyday lives.

Because of the diversity in the educational institutions in the United States, accreditation allows each individual university regardless if it is a private or public school, a small college or large research university, or an urban or rural institution the ability to deliver its courses in whatever manner is most fitting for that institution, while maintaining a standard of quality across the country. Obviously the key to an effective accreditation is a set of rules or criteria that define what each institution must do to become accredited.

If you believe in the value of accreditation, then assessment is a necessary part of the process. Assessment tools are the means that assure accountability and are used to assure that an institution is meeting the requirements of the accreditation criteria.

However, accreditation is not the only reason for an assessment program on your campus. Student outcome assessment has become a primary focus for institutions of higher education for reasons beyond accreditation including industry pressure, government funding sources, and continuous quality improvement. Thus, it makes good sense that in order to change or improve programs; meaningful data must be collected on the current program in order to make informed decisions as to what to change in the program to make it better or to correct deficiencies. In summary, some of the advantages of assessment include:

1. It informs faculty what is and what is not working in the curriculum and in the delivery of the curriculum.
2. It provides a measurement of student learning which is the ultimate goal of a college education, yet frequently not directly measured or tracked.
3. It allows for continuous improvement based on evidence clearly tied to outcomes.
4. It includes viewpoints of constituents – students, local industry representative, university assessment administrators, and faculty. Polling constituents was often overlooked in pre-ABET EC2000 days.

Enthusiasm for the process is generated by results in student performance followed by improved results because of the changes made. There is a certain amount of inertia that must be overcome in the first few years when faculty members see the value of making changes based on data.

The benefits of program evaluation are apparent from the fact that investments made for program evaluation and consequent accreditation can uncover beneficial attributes of faculty and students. For example, TABLE 1 shows that the highest ranked program attributes of faculty and students, as adapted from Brandon [2].

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Faculty score and rank</th>
<th>Student score and rank</th>
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<tbody>
<tr>
<td>1. Develops thinking and reasoning skills</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2. Prepares students to become independent, self directed lifelong learners</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. Produces competent, caring, and ethical practitioners</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4. Encourages acquisition of adequate knowledge for applications</td>
<td>4</td>
<td>10</td>
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<tr>
<td>5. Fosters broad philosophical perspective</td>
<td>5</td>
<td>19</td>
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<tr>
<td>6. Ensures that engineering problems reflect program objectives</td>
<td>6</td>
<td>6</td>
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<tr>
<td>7. Encourages teamwork and development of skill in communicating with others</td>
<td>7</td>
<td>13</td>
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<tr>
<td>8. Promotes student learning about self (habits, attitudes and values) and development of those habits</td>
<td>8</td>
<td>32</td>
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<tr>
<td>9. Fosters understanding of psychological aspects of learning</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>10. Encourages acquisition of adequate basic science knowledge</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>11. Ensures that students, faculty and staff understand Problem Based Learning (PBL) objectives</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>12. Encourages faculty commitment to students as well as to the program, and fosters the development of mutual respect between students and their teachers</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>13. Encourages communication between program planners, faculty and students</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>14. Makes multiple modes of learning including lecture and student participation</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>15. Creates a non-competitive and non-threatening environment and facilitates positive interaction</td>
<td>29</td>
<td>4</td>
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These rankings indicate a distinct difference between student and faculty opinions on program outcomes. All the stakeholders’ benefit from clear outcomes based program evaluation, whose questionnaires are structured for collecting evidence of program goals and objectives or progress toward meeting goals and objectives.
BASIC ABET REGULATIONS AND WHAT MUST BE DONE

The Objectives of Accreditation as stated on the ABET website are:

- To identify to the public, prospective students, student counselors, parents, educational institutions, professional societies, potential employers, governmental agencies, and state licensing or certification boards, specific programs that meet minimum criteria for accreditation.
- To provide guidance for the improvement of the existing and development of future educational programs in engineering, technology, and computing, and applied science areas.
- To stimulate the improvement of engineering, technology, computing, and applied science education in the United States.

To meet accreditation ABET mandates that “each program must have an assessment process with documented results. Evidence must be given that the results are applied to the further development and improvement of the program. The assessment process must demonstrate that the outcomes important to the mission of the institution and the objectives of the program, including those listed above, are being measured. Evidence that may be used includes, but is not limited to the following: student portfolios, including design projects; nationally normed subject content examinations; alumni surveys that document professional accomplishments and career development activities; employer surveys; and placement data of graduates” [1].

Program Educational Objectives and Program Outcomes

Basic ABET requirements focus on the assessment of Program Educational Objectives (PEOs) and Program Outcomes (POs) using sound methods of outcomes assessment in a continuous improvement process. While the amount of assessment data needed is the particular emphasis of this paper, it is important to relate assessment both to educational objectives and process improvement. Without getting into the details of the PEOs and the POs, the former generally describe what your graduates will look like several years beyond graduation and tend to reflect more general attributes of working engineers. The latter are more specific than the PEOs and reflect EC 2000’s Criterion 3, outcomes (a) through (k), either directly through the adoption of the (a) through (k) with modifications to fit your situation or indirectly through a mapping process. Programs are expected to publicize their PEOs and POs to its constituents, including its institutional catalogs, campus and departmental web sites, and course syllabi.

Assessment is to be performed not only for Program Outcomes (a) through (k) from Criterion 3 as shown in Table 2, but also for any added outcomes indicated by the program educational objectives that have been formulated, approved, and possibly revised by program constituencies. These added outcomes may have been included to describe unique features that distinguish a given program from those at other universities. Moreover, Criterion 4 (Professional Component) and Criterion 8 (Program Criteria) have components for which assessment is also needed.

<table>
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<th>TABLE 2</th>
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<tr>
<td>Criterion 3. Program Outcomes and Assessment</td>
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<td>Engineering programs must demonstrate that their graduates have:</td>
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<tr>
<td>(a) An ability to apply knowledge of mathematics, science, and engineering</td>
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<td>(b) An ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<tr>
<td>(c) An ability to design a system, component, or process to meet desired needs</td>
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<tr>
<td>(d) An ability to function on multi-disciplinary teams</td>
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<tr>
<td>(e) An ability to identify, formulate, and solve engineering problems</td>
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<tr>
<td>(f) An understanding of professional and ethical responsibility</td>
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<td>(g) An ability to communicate effectively</td>
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<td>(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
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<tr>
<td>(i) A recognition of the need for, and an ability to engage in lifelong learning</td>
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<tr>
<td>(j) A knowledge of contemporary issues</td>
</tr>
<tr>
<td>(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
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</table>

Recent recommendations from ABET/EAC trainers say that Program Outcomes should be assessed using current students and graduates, while the Program Educational Objectives should be assessed using employers’, advisory board, or alumni feedback. Furthermore, recent feedback from ABET trainers is that too much dependence has been placed on indirect evidence, which result from surveys, and more direct evidence from assessment of actual student performance is needed.

Recommendations from experts on outcomes assessment suggest that ABET’s Program Outcomes are too broad to be assessed directly with any usefulness in program improvement. In one way or another, programs will need to write a set of more measurable behaviors for each PO, and these called Measurable Outcomes (MOs) or Measurable Learning Outcomes (MLOs). There are several ways to accomplish this, and careful planning with the use of consultants who can provide you with background information on your options is often recommended.

Programs usually perform assessment every semester (or term) for selected courses in their program. Only designated outcomes, perhaps 3 with a maximum of 10 in number for a given course, are assessed for that course. For completeness, a matrix relating all courses to all outcomes can be used to guarantee that each outcome is covered by at least one course, including those outcomes related specifically to the major design experience.
A sound assessment process calls for a strategy called triangulation, where multiple sources of data (at least two) are used to determine your program success in achieving your PEOs and POs. The reason for this is the fuzziness of the statistics that you will generate in your assessment process due to the number for variables that can affect student performance on objective measures.

A Formal Feedback Process for Assessment Findings

If you are in your second visit under EC 2000, evaluators will probably look for a presentation of the impact of changes made due to the findings from your previous round of outcomes assessment. Thus a system must be in place for feeding your assessment findings back into your curriculum planning process to make continuous process improvements. This feedback can take place through several routes, including your curriculum committee, your department chair, and your assessment committee. More than just having a system, it is further required that actual assessment results are utilized to achieve improvements by alternately performing outcomes assessment, making improvements in the program, and performing more assessments afterwards on the improved process. In brief, assessment results obtained during one semester are analyzed and key features extracted to indicate which improvements are indicated. Program changes are made during the next semester; further assessments of the resulting outcomes are collected and analyzed, and so forth.

How Much Is Enough?

The key point is analyzing assessment results and determining which program change is warranted. The main question of this paper is, “How much assessment is enough or when is enough, enough?” There is no answer to this question that is quantitative in nature. The best we can say is that you have to demonstrate to ABET that your program has met accreditation criteria. Performing reasonable assessment that lead to critical program changes can alleviate faculty concerns that too much data are being required. Therefore, a simple answer would be, enough assessment tools have to be initiated to critically evaluate a program and make improvements. However, several types of assessment tools may be helpful in verifying the statistical significance of the assessment results. In all cases, careful documentation of assessment and program improvements are essential.

Over a period of time and several visits, programs will eventually fine tune their assessment processes through the identification of the optimal set of courses and measures that will provide them with enough data to promote continuous improvement. To shorten that process, consultation with colleagues at recently visited programs might help.

Session T3H

BALANCING WORK EXPENDED DOING ASSESSMENT AND THE BENEFITS OF ASSESSMENT

The fundamental tenets of assessment have been understood and utilized by good educators for hundreds of years. Good teachers understood that classroom learning is, at its core, based on honesty, vulnerability, and communication. Excellent teachers have always been excellent listeners; in tune with their students, noting body language, using eye contact, and responding to both spoken and unspoken questions. This is why good teaching is often as much art as science. No two students are ever alike. They are not a simple product of some process; a widget whose characteristics can be “improved” by altering the manufacturing process. Yet, the application of Total Quality Management (TQM) principles to the education process, in the form of outcomes-based assessment is often implemented with this industrial paradigm in mind.

Much of the difficulty with outcomes-based assessment arises from serious misconceptions about statistics, the education process, and the highly individual nature of student learning. It is clear that examining student performance and reflecting on the pedagogy in a creative effort to improve student comprehension can derive significant value, but the focus on “accurate” measurement of performance (outcomes), the application of industrial total quality management principles, and the reliance on statistical results (often from small sample sets) is very troubling.

First and foremost in the list of consequences of misapplied assessment is the “dumbing-down” of the material presented. Difficult and challenging material is not often “fun” to learn, as mature thought can be hard work that requires discipline and perseverance. If we respond to such results by assuming that poor performance is reflective of process problems, and reduce coverage to achieve better results so as to show “constant improvement,” we submit to cultural mediocrity.

A second serious consequence of assessment is a fundamental alteration of the nature of topic delivery. Conceptual, theoretical and intuitive presentations do not easily correlate with “ability” style outcomes present in ABET criteria as there is often no directly associated task or skill. A natural response to this difficulty is to pursue a more “plug-and-chug” approach for which very specific problems and projects can be used to illustrate outcome accomplishment. This is not unlike the serious problems arising in K-12 education as teachers are forced to “teach to the test” in order to maintain funding. In other words, the act of measurement seriously alters what you are trying to measure!

A third consequence of assessment gone awry is a basic change in the culture predominant in academia. In the past, faculty were assumed to be well intentioned, self disciplined, and highly motivated. The content, structure, and delivery methods utilized in a course were left to the creative energies of the individual faculty (within of course, the
constraints created by fundamental pre-requisites and course sequences). Faculty had no “bosses”, only colleagues. Their primary accountability was to a sense of personal integrity. This is completely incompatible with industrial management practices and the new ABET rules which demand the use of assessment tools designed to ensure accountability [3]. There are always a percentage of “bad-eggs” in any college, but in the past, it was considered more important to cultivate an environment where the majority could flourish than to impose a set of constraints designed to force outliers to perform.

The following balance needs to be addressed regarding the outcomes-based assessment process. Are outcomes actually as measurable as presumed? Are the constituencies called upon to contribute to the process appropriate? What is lost when large amounts of faculty time are redirected to documentation?

One would be justified in concluding that in small sample sizes (20-25 students) the measurements are not statistically meaningful. The confidence intervals for an individual class summary are so large as to make any substantive numerically based conclusions impossible. Also, there is no basis in assuming that subsequent course offerings would yield data, which could be combined with that of earlier data, as the “experiment” is clearly different. Of course, this discussion is predicated on the ability to actually generate meaningful measurements on such abstract outcomes as “an ability to function effectively on multi-disciplinary teams,” or “a recognition of need for, and an ability to engage in life-long learning.” In light of this observation, it is reasonable to consider undertaking a cost-benefit analysis of this assessment process.

ABET requirements call for a program to identify constituents, which may include students, industry representatives, administrators, and faculty. Problems arise when constituents are either unqualified to comment on objectives and outcomes or when constituents yield contradictory advise. For example, students are unqualified to comment on theory and content. They do not know what they need to learn to be successful engineers. Industry opinion, while often useful, can be very narrowly focused on very specific current needs such as proficiency in a certain software program; there is some serious question as to whether or not it is beneficial to engineering education as a whole to attempt to tailor a program to the transient needs of the local community [4]. Also, industry experts often have very conflicting viewpoints tainted by their particular experience. Finally, many university administrators have little or no academic experience. Overall, it can be hard to balance opinions from identified constituents.

The work involved in documenting the process is enormous - some who have gone through recent accreditation visits claims as much as 3000 hours at the chairperson level. Many individuals personally invested in the current process would dismiss this workload by invoking such platitudes as “work smarter, not longer”. One might suggest that the enormous work employed to generate volumes of detailed data may be due to flaws in the premises and philosophy behind outcome assessment, and not to lack of vision or intuition on the part of the faculty on the front lines. It is worth pointing out that the proponents of ABET EC2000 criteria claimed that it would be less tedious then the old ABET criteria to implement [4]. However, as with any new system, there is a learning curve that has taxed the resources of many programs. Many smaller universities do not have the resources to provide additional help in spearheading the assessment effort. Consequently, faculty members have to sacrifice student advising, curriculum development, research, office hours (face-time with students), and personal time to complete the task. Given that resources are limited, should the focus be on doing an effective job of teaching or extensively documenting it according to some model?

Assessment has conceptual valuable including identifying gaps in curriculum coverage, in providing focus on course material, in initiating improvement in laboratory and other infrastructure, etc. However, because of the subjective nature, it can also be abused. Bad teachers can still fake results and accountability only affects those who already cared. Like with any other newly started process we are going through the growing pains in institutionalizing the new ABET criteria. In the spirit of assessment and quality improvement, it is time to reflect on the process and potentially scale it back. Unfortunately, there is currently a suffocating consensus in educational literature. The attitude of the zealots is “if you are not with us – you are not well informed, therefore you need to be educated”. Informed dissent is critical to obtaining true knowledge and we must allow the assessment process itself to be assessed.

**INTERESTING THINGS THAT PROGRAMS HAVE FOUND THROUGH ASSESSMENT**

**How much time it takes to do a good job.**

A quality assessment program takes a significant amount of time for the person primarily responsible for assessment in a department. That person needs to be fully invested in the process and be rewarded for that investment in the form of course release, evaluation for merit pay increases, and consideration into promotion and tenure. The key person then encourages faculty and ensures that the process runs smoothly (activity in this area is significant) with reasonable effort from the rest of the faculty. As the process matures, additional effort in educating other faculty and new faculty is also required.

Conservative estimates indicate that it takes up to two years to write the self-study documentation under the assumption that the assessment of your outcomes is done or nearly done. One program is known to have written its self-

study document in approximately one year, but it required almost 100% of the time of a former assistant department chair, who was familiar with the curriculum and an outcomes assessment program that was in existence for approximately seven years.

If you assess student performance in traditional lecture-recitation courses, it would be wise to build assessment into the grading process by carefully designing exams, homework and projects so that they can be scored both for grading purposes and assessment purposes. This merely requires the development of a scoring rubric that categorizes your problems or projects according to some assessment scheme, whether this scheme is one that addresses problem complexity on a cognitive basis or contents on a Program Outcome basis. This strategy can also be used for laboratory projects.

Finally, with smaller programs, the same amount of effort is required with less overall faculty involvement.

**Things that can be done to streamline the process**

Programs might have over redundancy in both number of Program Outcomes and the measurement of those outcomes. For example, matrices can be used to map outcomes onto ABET a – k which could indicate redundancy. This in turn could lead to a reduction in the number of Program Outcomes and subsequently a reduction of measures. Likewise, a matrix to indicate how each outcome is assessed could make certain outcomes are being assessed using six tools while other are being assess using only two tools. Balancing or reducing the number of assessment techniques can help streamline the process.

There are numerous sources available for streamlining the assessment process. For example, streamlining was a constant theme at the 2003 Best Assessment Processes V Symposium that was held at the Rose-Hulman Institute of Technology in April 2003. One of the common themes was the development of a standard reporting form for faculty members to use in reporting assessment data and assessment findings.

This leads to another example for streamlining the assessment process. Do not try to re-invent the wheel! There are several sources of information that is available to you. A significant resource is your campus assessment officer and your campus assessment committee. It always pays to get an expert involved in the process.

Without a doubt, attending workshops and paper sessions on assessment at both assessment and engineering education conferences are extremely useful, but one of the best sources of information can be found at engineering education conferences, and that is the conversations that you can engage in with colleagues at other institutions who have recently been visited under EC 2000. Just be sure that you do not fall into several traps, such as implementing what you hear without first determining whether or not it fits your culture, your program, your students, and your faculty.

Programs have reported that they conducted a mock visit, bringing to campus someone who has either been visited recently or an evaluator. As with any advice from an outsider, be sure that you weigh the advice against your situation.

**Making sense of assessment data**

When putting an assessment report together for ABET, it is easy to put data together that looks very professional but has very little actual use. The hard part is trying to find that elusive set of data that is profound, useful, and "big picture." However, there are examples in the literature. Typically you end up with a lot of detailed data, which took a lot of work. More than that, the follow-up feedback is tedious because you have to follow-up on all the details.

The real goal should be to use our engineering judgment on topics such as balance between risk and profit, cost and quality, etc. to find the proper balance between collecting data for the sake of collecting data with collecting data that is meaningful and practical. The balance can be university dependent, if someone wants to say from his or her side that it is not too much work, then that would be ok. If however, someone wants to say that you need to streamline it and find that sufficient set of measures that give you good data for continuous improvement without killing the faculty, to make it built into the courses and the departmental practices, then that should be acceptable also. This does not mean we need a minimalist set of assessment measures that will do the job for every program.

**How to Get Faculty Started in Continuous Improvement**

A good suggestion for getting faculty interested in assessment is to start with the assessment of something that faculty will find interesting. For example, starting with an employer survey or an alumni survey seems to generate faculty interest and faculty involvement because faculty generally want to know what people think of the education that their students are getting. They do not see this as outcomes assessment.

Another consideration would be to reward faculty for their participation in assessment and program improvement. This can be done through faculty incentive programs or through merit evaluations. At some institutions, the introduction of the scholarship of teaching, assessment, and learning might help. If faculty are rewarded for scholarship and can be shown how classroom or program assessment can be a scholarly activity, they might be more willing to participate in assessment programs.

**Interesting Things That People (Departments) Did in the Presentation of Their Information**

A well-designed presentation of your information will certainly help your visit run smoothly, and we have heard of
several clever and innovative methods of presenting information. At one institution, they produced separate binders of information for each Program Outcome (a) through (k), containing samples of work from the various courses that they selected for each outcome. At another institution, they used their pre-EC 2000 method of demonstrating coursework, where they created stacks of course materials for each course, with the addition of two things. First, they created posters that contained a table of their Program Outcomes, showing the courses that were assessed for each PO, and second, they placed a copy of the scoring rubric that they used to assess the course. In that way, the evaluators were able to go directly to the courses that had assessment data first. Overall, organization and clarity is the key when presenting assessment data.

**SUMMARY**

The concept of assessment and the need for accountability in the classroom is something that appears to span both extremes in the debate over assessment. It is not the act of assessment that is causing the differences, but the level of importance that different groups place on the process.

Ultimately our objective as educators is to ensure that we turn out high quality graduates and to achieve this it is important to have some mechanism that incorporates feedback. Two questions we raise are: Can we place “sensors” that will precisely measure whether the student has “got it”? Are we devoting enormous amounts of time and energy to chasing something that can not be measured? There is no doubt that the EC2000 process has some advantages. It forces us to focus on the big picture, looking at the effects of what and how we teach, both at the course level and the program level. It ensures continuity, relevancy, and timeliness of knowledge as well as addressing what used to be considered as peripheral issues (teamwork, lifelong learning, etc.). But the fundamental premise of the process and the associated workload it creates also raises some important questions. Is it time to take a second look at the assessment process as it has currently evolving?

Under the principles of EC 2000, the accreditation process is supposed to be a partnership between the program and the evaluators, not a court where ABET is the judge and jury. ABET recommends that a communication process between the two parties be developed, where information is shared in both directions. This implies that the particular engineering department has a say in what is important to their mission, thus an assessment process must allow for the department to design their program so it meets the needs of their community and their users. To support this, the assessment process must be developed and “owned” by the faculty at the department level. It must not be a “top down” process dictated by administrators.

Through this exercise, this group does not offer any answers, but hopes to address many of the concerns faculty have regarding assessment and also establish a dialog on creating a balanced assessment plan.

The question of "How much is enough?" can be seen as a dilemma. On one hand, since accreditation is at stake, programs may assess more than necessary to be on the safe side. Over-assessing may demonstrate to your evaluator that you are serious about outcomes assessment; however, over-assessment will probably generate redundant data and consume valuable faculty time. This could make it difficult in finding ways to make improvements, thus, running counter to the reason why assessment data is collected in the first place.

There is no simplistic answer to the question "when is enough assessment enough?" Instead, we close with one professors thoughts about assessment: "I need to be sure that my students can perform and the only way I know for sure is to conduct careful measurements that convince me that meaningful learning has occurred. Because this process creates evidence, this naturally produces results that I can show to others such as and colleagues from ABET. What I have learned over time is that there are many ways to perform assessments, and the best ways are time effective and a natural part of teaching. For me, the best part of assessment is the rich insights that I gain from the process--I use these insights to improve the practice of my craft.”

**REFERENCES**


[5]. Gloria Rogers, Rose-Hulman Institute of Technology, http://www.rose-hulman.edu/irpa/Gloria2and3.PDF